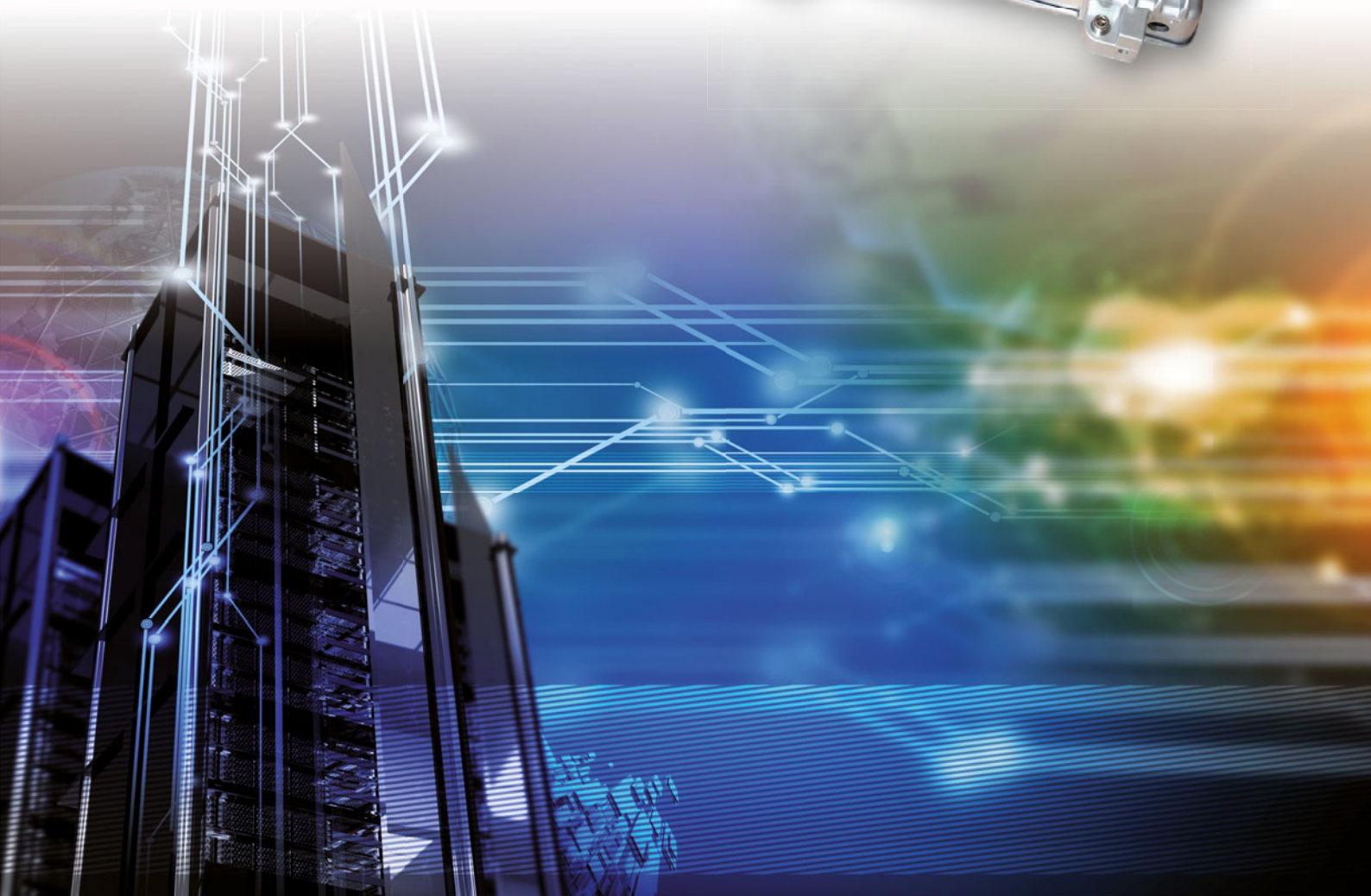




High-speed Internet over Coaxial Networks

**miniCMTS DOCSIS 3.0 & EuroDOCSIS 3.0**



## EuroDOCSIS 3.0 PERFORMANCE IN A MINICMTS

LICA is pleased to introduce the mature and field-proven EuroDOCSIS 3.0 miniCMTS.

Targeted at Operators, Internet Service Providers and property developers seeking a solution for high-speed Internet in MDU and hospitality environments, but facing technical, economic or political constraints limiting the options for using fiber and twisted-pair.



### LEVERAGING EXISTING COAX

Coaxial cabling is a reliable medium offering the fastest broadband performance after fiber, and widely installed in buildings of all ages.

The DOCSIS 3.0 miniCMTS enables cost effective access over existing coaxial cables up to 800 Mbps, making it possible to deliver a full complement of TV channels, together with telephony and high-speed Internet at up to 800 Mbps.

To date, the use of EoC (Ethernet over Coax) technology for in-building deployments has resulted in closed, proprietary systems with limited choice of vendor and CPE.

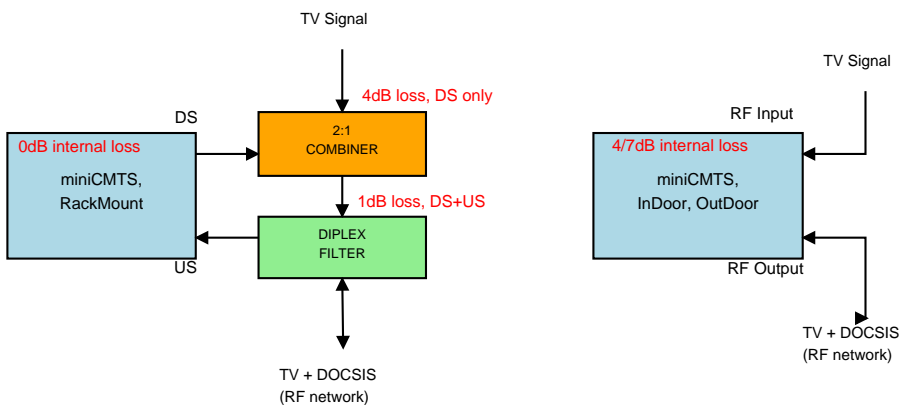
DOCSIS (Data Over Coax Service Interface Specification) is a well established and proven standard. Offering speeds up to 50 Mbps per channel, the DOCSIS 3.0 release allows channel bonding up to 16 channels. This enables a downstream performance of 800 Mbps at the Ethernet output.

### AVOIDING THE COSTS OF A TRADITIONAL CMTS

Until today, the use of DOCSIS in smaller networks has been limited by costs associated with the traditional CMTS (Cable Modem Termination System). The **miniCMTS** challenges this model.

The **miniCMTS** is a Broadcom based Layer 2 bridge compatible with all current DOCSIS 2.0 and DOCSIS 3.0 cable modems. Offering 1 Gbps input, it supports 4 channels upstream and 16 channels downstream with throughput of up to 800 Mbps when using QAM256.

#### miniCMTS RF connections



The LMC-2IU is housed in a very compact enclosure with power consumption of only 36 W, it supports a temperature range of -20 °C up to +70 °C so that no fans are needed. The LMC-2IU is the smallest size HW version and targets indoor installations. The LMC-1RU miniCMTS is designed for high-density rack installations and thus fans are used.

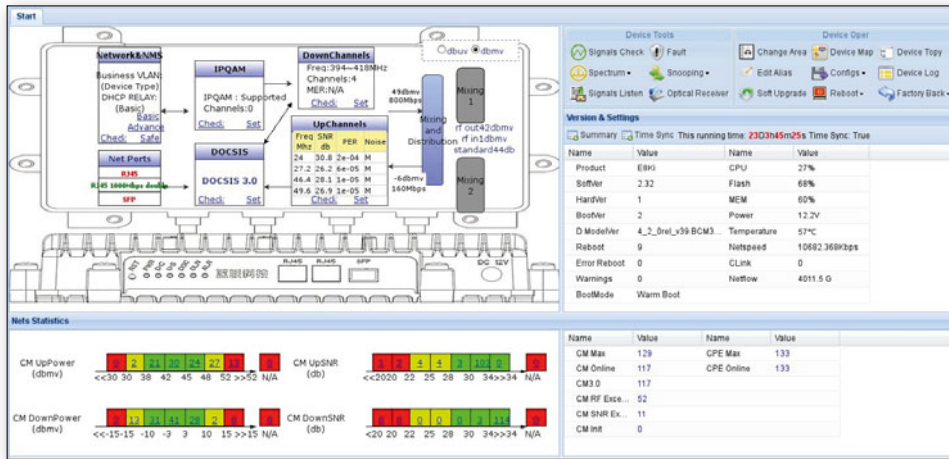
Combining TV (DVB-T or DVB-C) channels with modulated DOCSIS down/upstreams can be done in the unit (LMC-2IU) or has to be done outside of the unit (LMC-1RU). The combined channel pattern is then distributed over the common coaxial cable infrastructure. The miniCMTS also features an integrated QAM modulator which can be used to provide DVB-C linear TV broadcast over 8 channels of the 16 available channels.

IPTV Multicast video distribution is supported allowing yet another way to deliver video streams to the customers.

#### Common frequency channels:

5 to 65 MHz	DOCSIS upstream channels (2 or 4 channels, offering 32 Mbps up to 120 Mbps)
87 to 108 MHz	FM radio
230 to 470 MHz	DOCSIS downstream channels (800Mbps with 16 channels and QAM256 modulation; 560Mbps with 16 channels and QAM64 modulation)
470 to 862 MHz	DVB-T or DVB-C paid/free to air TV channels

miniCMTS built-in configuration and monitoring WebGUI



**EASY SETUP**

The miniCMTS has an internal, web-based configuration GUI allowing easy setup of the HFC and IP configuration.

Internal miniCMTS Command Line Interface (CLI) offers text-based full-scale configuration tools and also basic monitoring. Standardized SNMP interface is available allowing integration into many available DOCSIS provisioning systems.

**SIMPLE INSTALLATION**

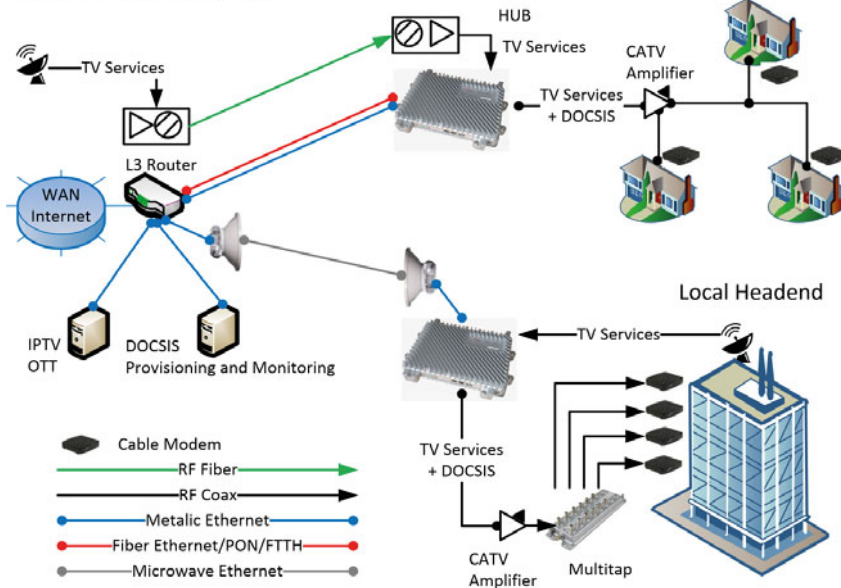
Customer premises installation is simple, making use of existing TV outlets fitted with an „internet optimizer“. This provides a diplex filter and an F-connector for connecting a standard cable modem. The diplex filter provides isolation for non-data frequencies, ensuring good Signal to Noise Ratio (SNR).

In order to guarantee performance, the use of triple or quad shielded coax patch cords with „signal tight“ connectors is recommended to minimize ingress between wall outlet and cable modem.

Installation into existing TV outlet



**Central headend**



The miniCMTS supports 1Gbps Ethernet at the input, and the use of a PON ONU or optical/electrical SFP is also possible. This allows a fiber optic trunk line to be leveraged providing Fast Ethernet in small and large coaxial networks. Being a L2 device, an external L3 router is required to complete the architecture. DHCP & TFTP servers, that support the cable modem setup procedure, can be external, for simple setups also internal miniCMTS tools are offered.

Integration into the IP environment needs basic IP and networking knowledge, commonly available within an ISP or as a service from your integrator.

The LMC-1RU and LMC-2IU are available in fixed configuration of 16 Downstreams and 4 Upstreams, they support up to 300 EuroDOCSIS 3.0 Cable modems or up to 500 EuroDOCSIS 2.0 modems.

Network design using miniCMTS

**DELIVERING HIGH-VALUE INTERNET SERVICES**

For an Operator, the miniCMTS offers a compelling solution for the delivery of high-speed Internet and telephony services over small and medium CATV networks. The miniCMTS offers a cost-effective alternative to the installation of fiber optics, and is particularly attractive for environments where coaxial cabling is already in place.

Through compatibility with existing cable modems and the widely used DOCSIS and EuroDOCSIS standards, a high-performance and future proof solution can be created for MDU, Campus and Hospitality environments.





## Specifications

Module	Parameter	LMC-1RU	LMC-2IU	
Main	DOCSIS compatibility	EuroDOCSIS 2.0 and 3.0		
	IPQAM (DVB-C)	Up to 8 Downstream channels		
Downstream	QAM standards	Annex A, B		
	QAM modulation	64QAM, 256QAM		
	Channels	16		
	Throughput (customers)	800 Mbps (16x Annex A, QAM256)		
	Frequency range	87 MHz – 1000 MHz		
	Channel width	8 MHz (Annex A) or 6 MHz (Annex B)		
	Max. Output Power level (internal)	45 dBmV/105dBμV		
Upstream	Upstream modulation	QPSK, 16QAM, 64QAM, 256QAM ; ATDMA, SCDMA		
	Channels	4		
	Throughput (customers)	110 Mbps (4x 6,4MHz, QAM64)		
	Frequency range	5 MHz – 65 MHz		
	Internal Input Levels	-13 dBmV .. +23 dBmV		
RF part	RF ports	1 DS in + 1 US out	2 RF in + 2 RF out	
	Internal RF loss	0 dB	7 dB	
Network	Port speed	1 Gbps		
	Port Types	2x RJ45 + 1x SFP		
	Management protocols	HTTP, SNMP, SSH		
Functions	Max. Cable Modems	DOCSIS 2.0 up to 500; DOCSIS 3.0 up to 300		
	Dynamic load balancing	Supported		
	DHCP Relay	Option 60, Option 82		
	DHCP & TFTP	Internal DHCP & TFTP server for Cable Modems included		
	QoS	Supported		
	VLANs (802.1q)	Supported		
Other	Housing	RackMount, 1RU	Indoor	
	Environment	Operating Temperature: -20 °C to +70 °C		
		Humidity: 10% - 90%		
	Power supply	100-240V AC, 50/60 Hz	12V DC, Ext. PS 100-240V AC	
		Power consumption <= 45 W	Power consumption <= 36 W	
	Dimensions	483×406×43mm (1U)	331×259×63 mm	
Weight	4.8 kg	4.7 kg		